

Table 1

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European vehicle	left / right femur-force of driver	left / right femur-force of co-driver	belt-force of driver / co-driver	U <sub>H</sub>
F1	15190 N	nR N	5620 / 6100 N	20 / 80°
F2	2258 / 2700	1381 / 2315	7030 / 7310	25 / 90
F3	2785	1587	5142 / 5655	45 / 70
F4	3700	2300	nR / 6800	10 / 45
F5	2340	1630	6040 / 7050	50 / 50
F6	6858	2362	6015 / 6685	20 / 30
F7 without airbag	1480	2140	8220 / 8380	/
F8	1600	2100	3400 / 4700	20 / 40
F9	700 / 1200	1500 / 1100	6900 / 8400	25 / 50
F10	2750	2180	6580 / 6160	nR / 40
F11	1400 / 1200	900 / 1300	3600 / 3400	10 / 30
F12	2200 / 1700	1200 / 900	3000 / 3800	5 / 30
F13	2360	2610	9130 / 8510	40 / 50
F14	1300 / 1400	1300 / 900	8300 / 4400	0 / 10
F15	5100 / 1700	800 / 4400	3300 / 3700	0 / 40
F16	nR / 8300	2733 / 3980	6144 / 5415	5 / 85
F17	2037 / 11206	1323 / 1418	6829 / 7885	5 / 90
F18	4100	4700	5300 / 6400	60 / 30
F19	2300	2600	6500 / 5700	35 / 70

nR = no result

Table 2

	yaw O of driver / co-driver
F20	85 / 90°
F21	100 / nR

Table 3

	force of head	acceleration of head	acceleration of chest	force of neck	forward motion
child-seat	696 HIC	65 g	59 g	1516 N	552 mm
F11	229	38	40		
child-seat to F11	304 %	171 %	148 %		

Table 1

i/g

	left / right femur-force of driver	left / right femur-force of co-driver	belt-force of driver / co- driver	U <sub>H</sub>
Fiat Tipo®	15190 N	nR N	5620 / 6100 N	20 / 80 <sup>0</sup>
Opel Corsa®	2258 / 2700	1381 / 2315	7030 / 7310	25 / 90
VW Polo®	2785	1587	5142 / 5655	45 / 70
Fiat Bravo®	3700	2300	nR / 6800	10 / 45
VW Golf®	2340	1630	6040 / 7050	50 / 50
MB C®	6858	2362	6015 / 6685	20 / 30
MB E200® ohne Airbag	1480	2140	8220 / 8380	/
VW Passat®	1600	2100	3400 / 4700	20 / 40
AUDI A6®	700 / 1200	1500 / 1100	6900 / 8400	25 / 50
Opel Omega®	2750	2180	6580 / 6160	nR / 40
BMW 528i®	1400 / 1200	900 / 1300	3600 / 3400	10 / 30
MB E320®	2200 / 1700	1200 / 900	3000 / 3800	5 / 30
AUDI A8®	2360	2610	9130 / 8510	40 / 50
BMW Z3®	1300 / 1400	1300 / 900	8300 / 4400	0 / 10
MB SLK®	5100 / 1700	800 / 4400	3300 / 3700	0 / 40
FB	nR / 8300	2733 / 3980	6144 / 5415	5 / 85
Renault Espace®	2037 / 11206	1323 / 1418	6829 / 7885	5 / 90
Opel Sintra®	4100	4700	5300 / 6400	60 / 30
VW Sharan®	2300	2600	6500 / 5700	35 / 70

FB = Peugeot 806®, Citroen Evasion®, Fiat Ulysse®, Lancia Zeta®

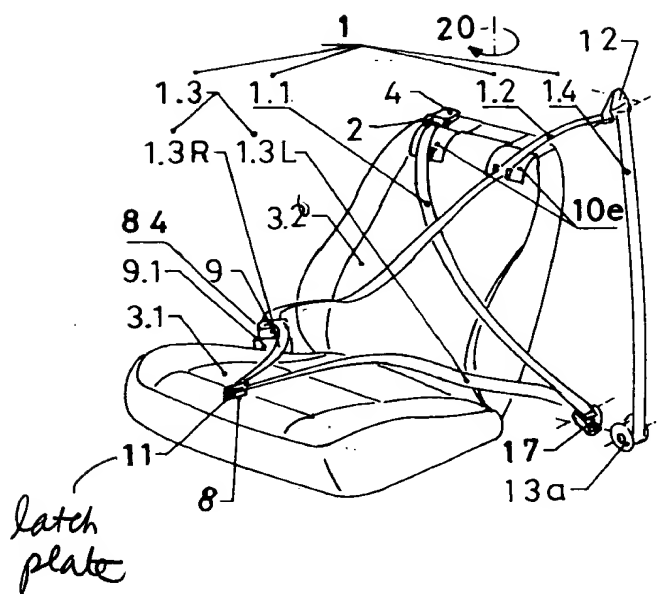
nR = no result

Table 2

	yaw O of driver / co-driver
BMW Z3®	85 / 90 <sup>0</sup>
MB SLK®	100 / nR

Table 3

	force of head	acceleration of head	acceleration of chest	force of neck	forward motion
child-seat	696 HIC	65 g	59 g	1516 N	552 mm
AUDI A4®	392	49	45		
MB E320®	229	38	40		
child-seat to MB E320®	304 %	171 %	148 %		



[illegible]

The diagram shows a mechanical system. A horizontal arm of length \$D\_H\$ is pivoted at its left end to a vertical support. The arm is at an angle \$\alpha\$ to the horizontal. At its right end, a block of mass \$m\$ is attached. The block can move vertically along a guide. The pivot is at a height \$D\_S\$ from the ground. The block is at a height \$D\_S + x\$ from the ground. The arm's angular position is \$\varphi\$ and its angular velocity is \$\dot{\varphi}\$. The block's vertical position is \$x\$ and its vertical velocity is \$\dot{x}\$. The forces acting on the block are gravity \$F\_G = mg\$ downwards, a normal force \$F\_N\$ upwards, and a spring force \$F\_S\$ upwards. The spring is attached to the block and the ground. The arm's forces are \$F\_{Hx}\$ and \$F\_{Hy}\$ at the pivot, and \$F\_{Sx}\$ and \$F\_{Sy}\$ at the block. The block's forces are \$F\_{Hx}\$ and \$F\_{Hy}\$ at the pivot, and \$F\_{Sx}\$ and \$F\_{Sy}\$ at the block. The equations of motion are given as:

$$m \ddot{x} = F_N + F_S - F_G$$

$$I \ddot{\varphi} = F_{Hy} D_H - F_{Sy} D_S$$

The diagram is labeled with 1.3, 95, 96, 3.2, and 3.1.

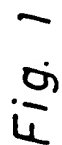
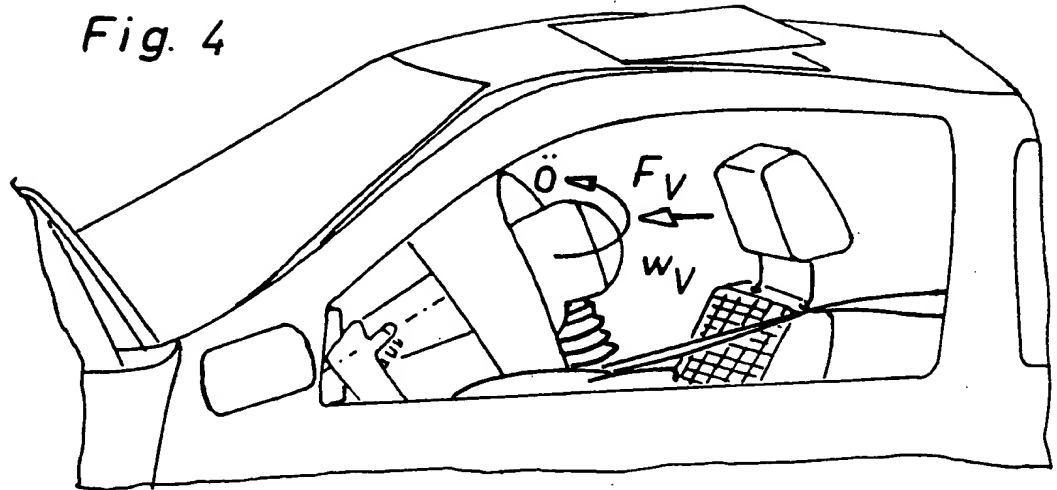


Fig. 2

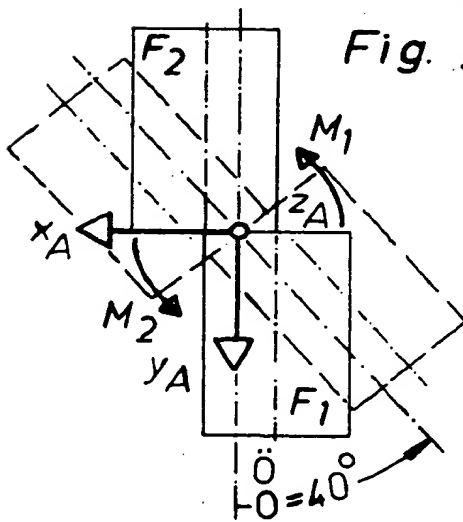
## Prior Art

*Fig. 4*



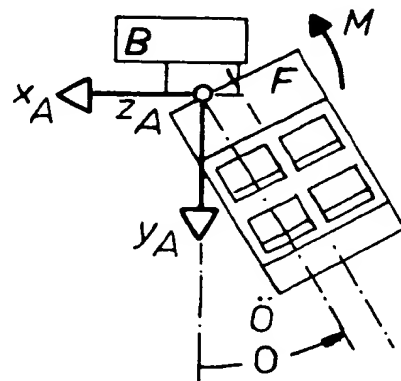
## Prior Art

*Fig. 5*



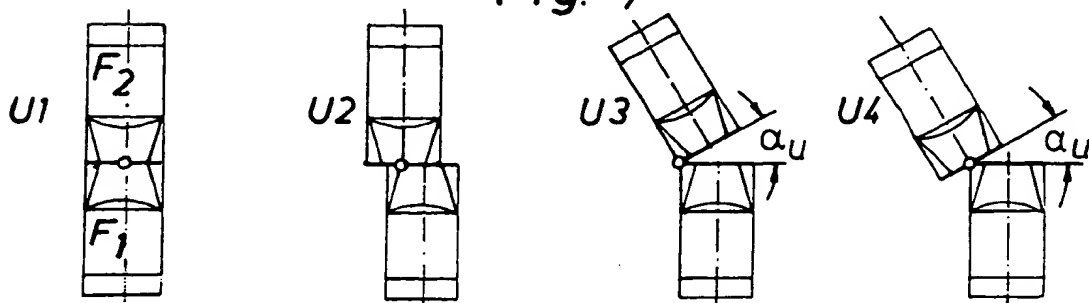
## Prior Art .

*Fig. 6*



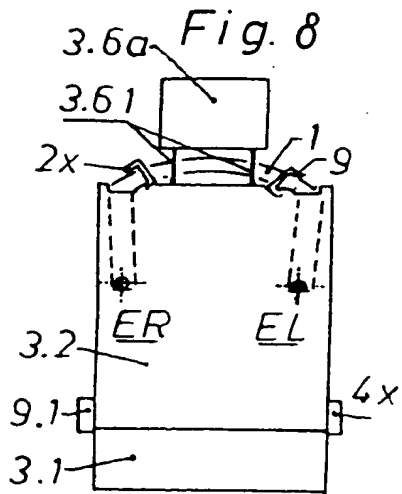
## Prior Art

*Fig. 7*

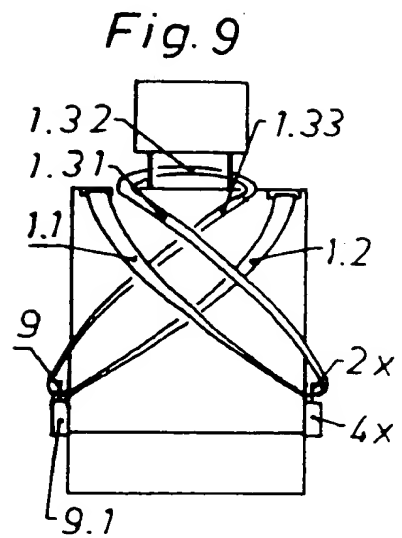


# Prior Art

Prior Art

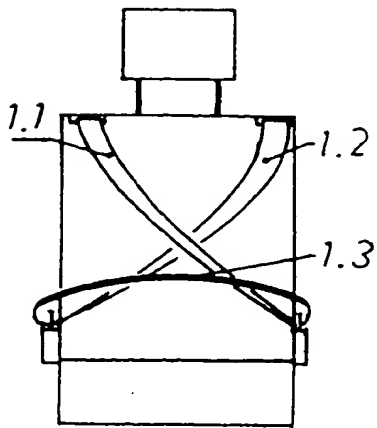


Prior Art



Prior Art

*Fig. 10*



*Fig. 11*

Prior Art

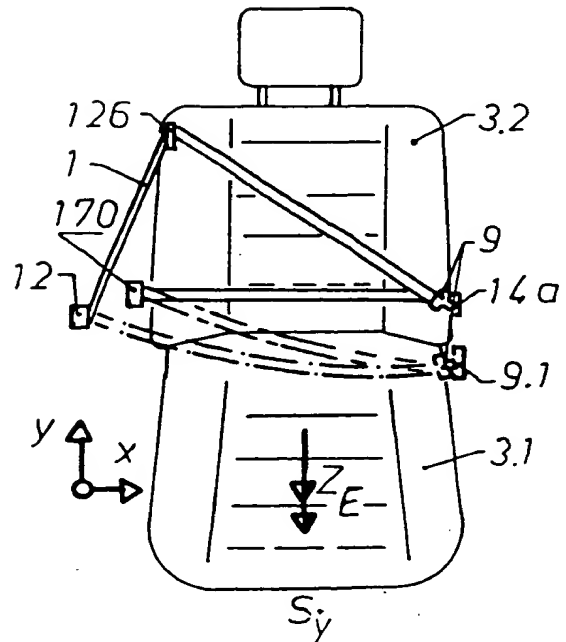


Fig. 12a

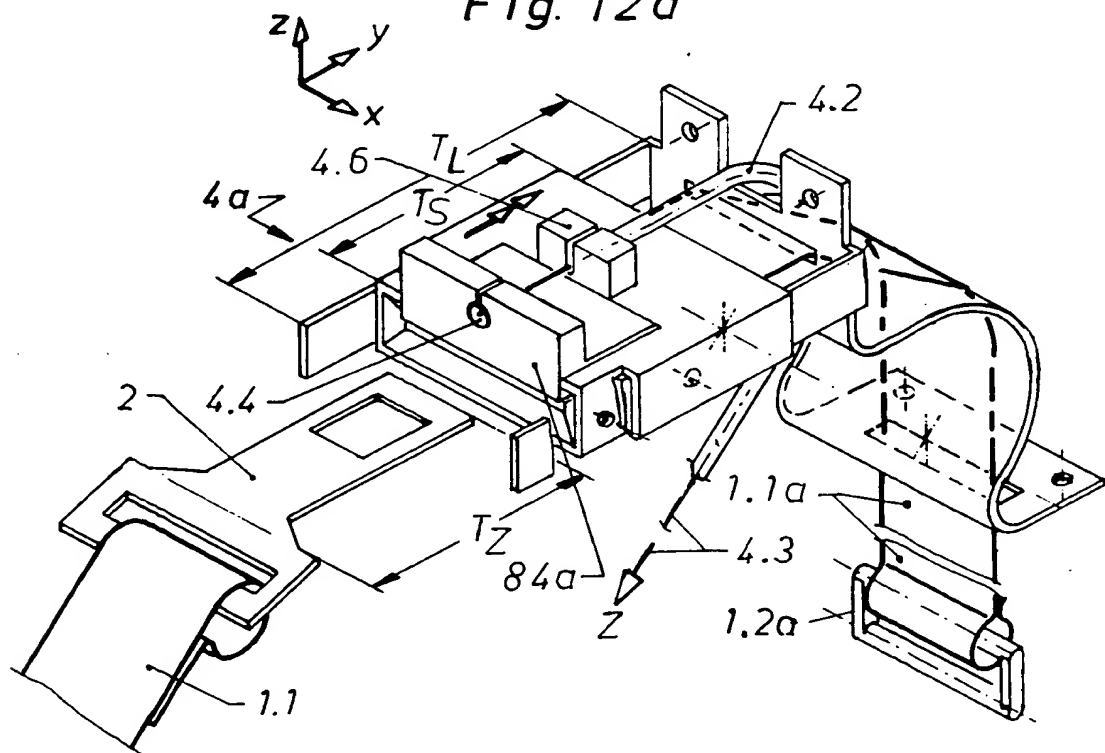
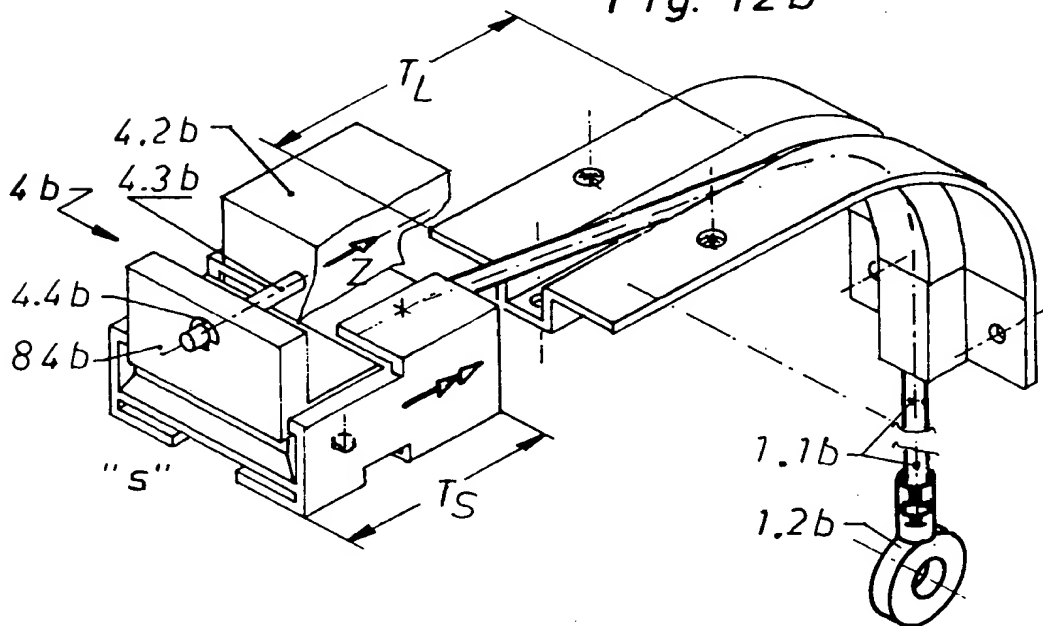
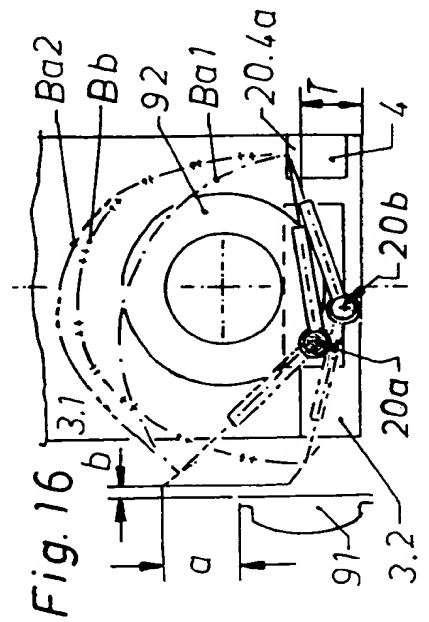
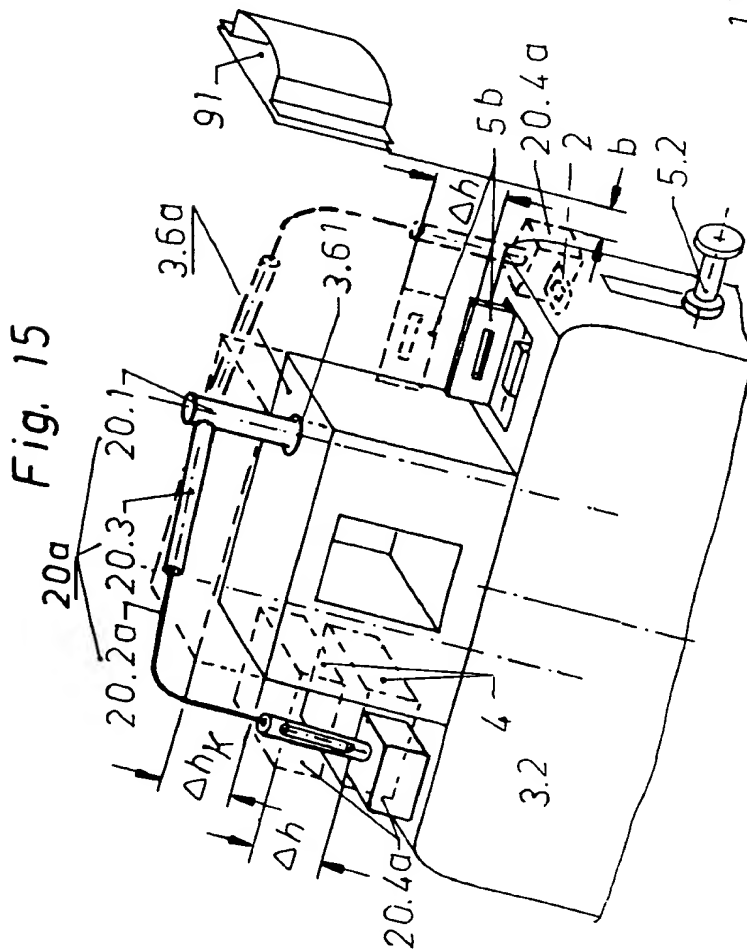
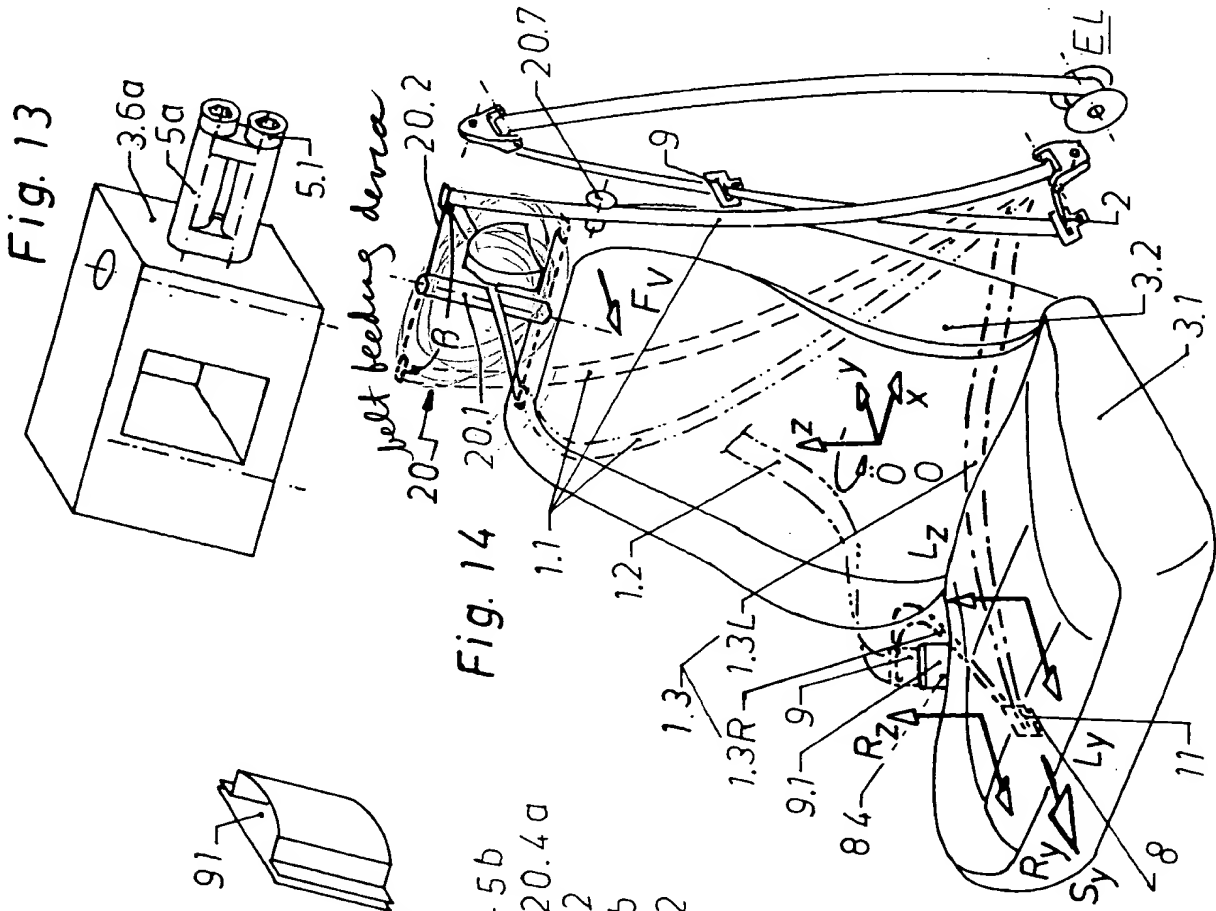
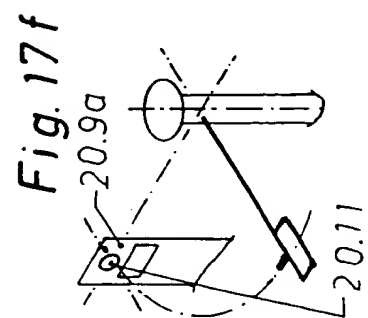
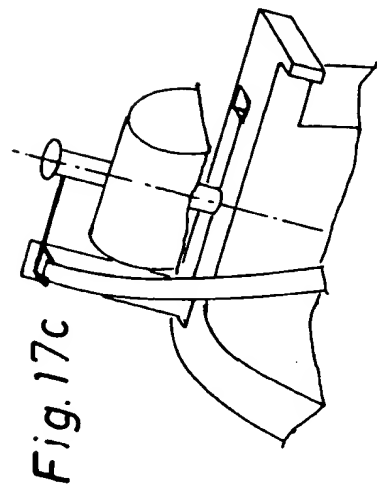
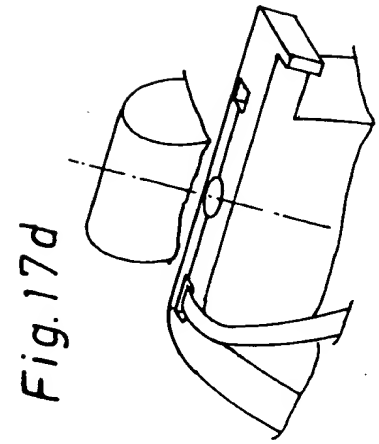
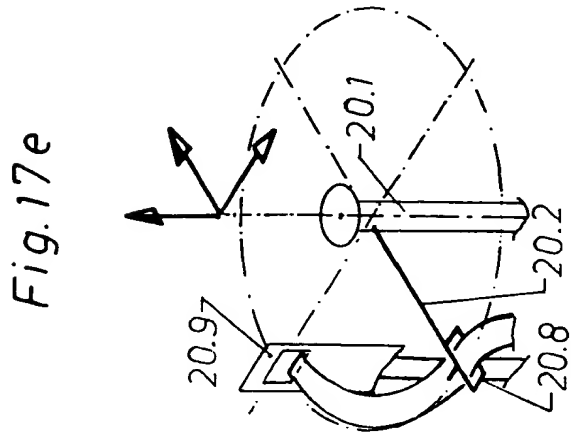
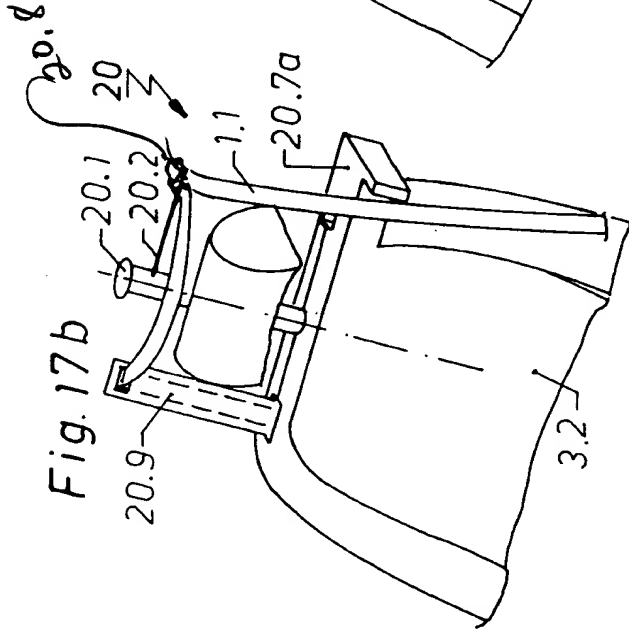
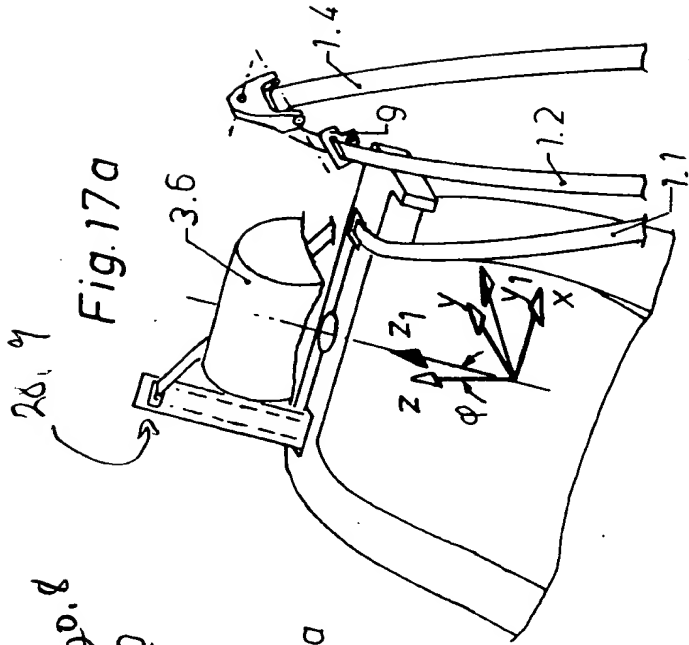


Fig. 12b









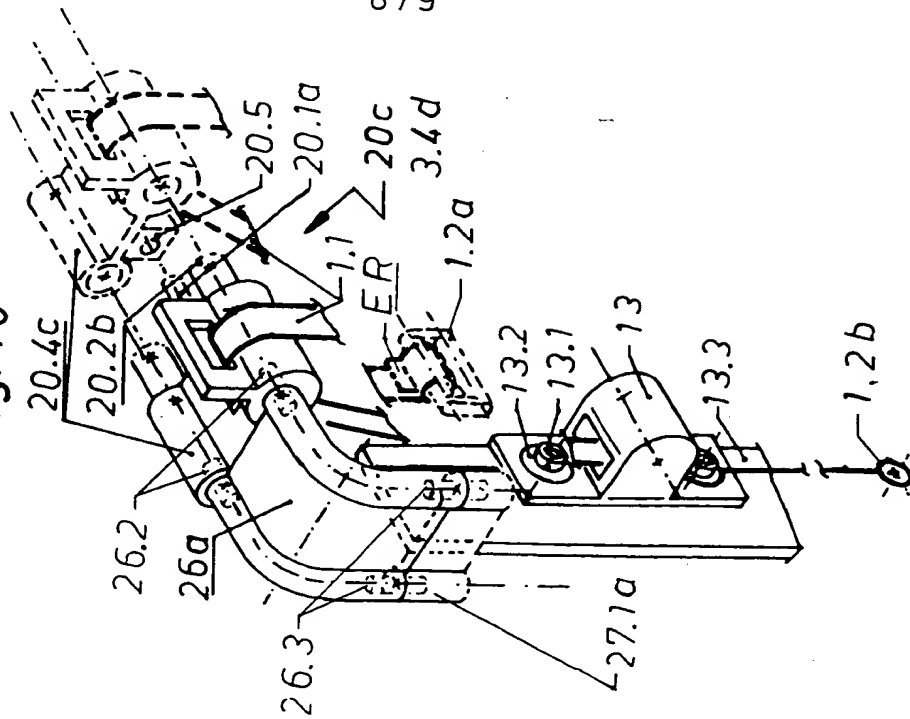
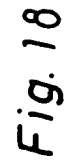


Fig. 20

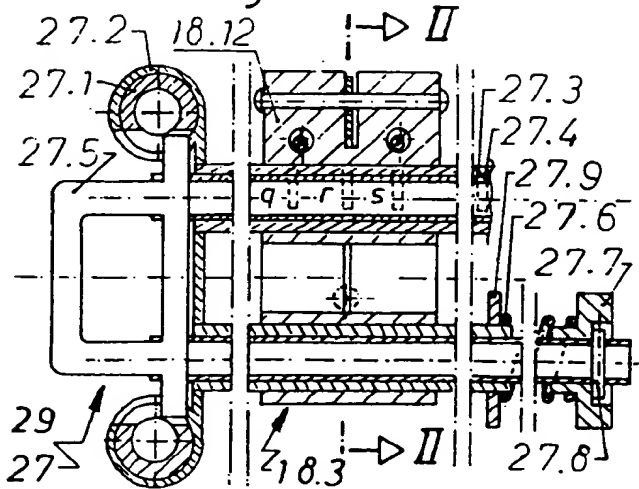
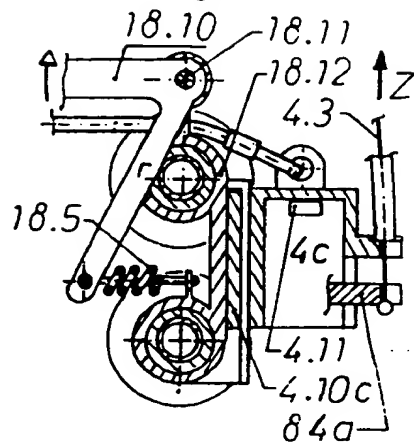
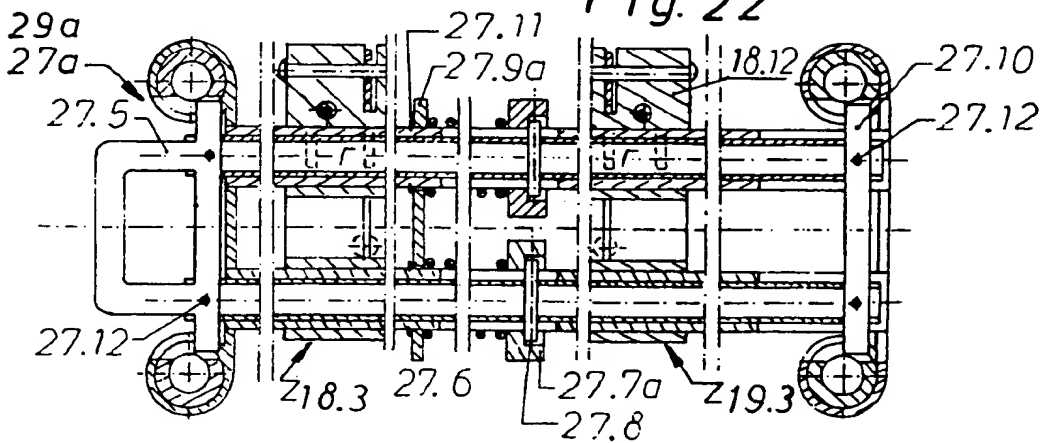


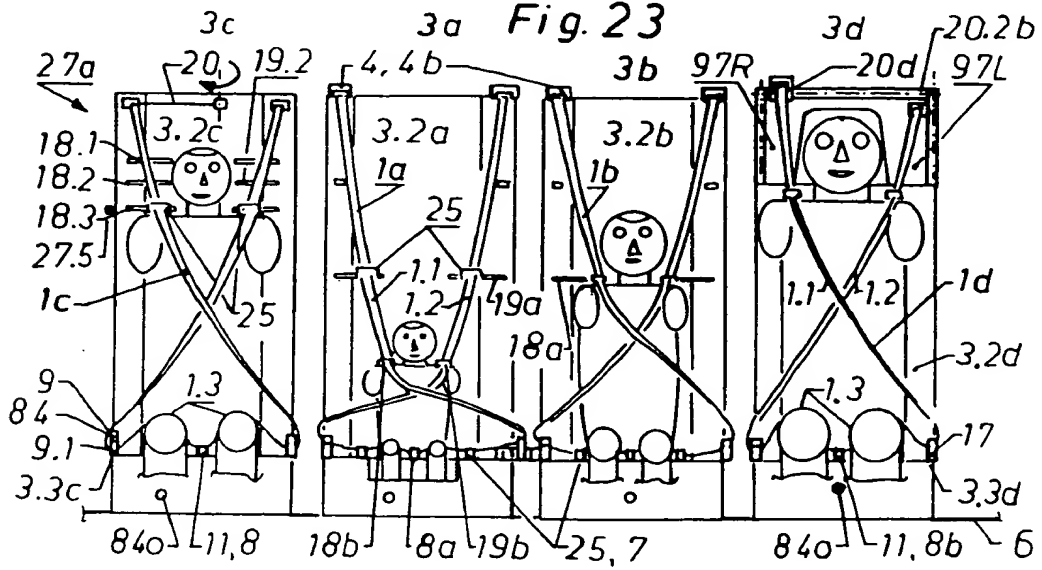
Fig. 21



*Fig. 22*



*Fig. 23*

[illegible]